



4.14 Classwork

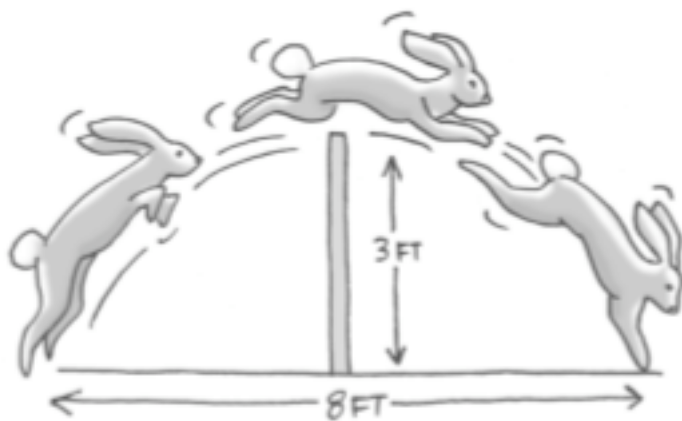
Name _____ Date _____

How can I model the data?
Mathematical modeling with parabolas

today's big goal Learn how to write quadratic equations for situations using the graphing form of the parabola $y = a(x - h)^2 + k$. Specifically, you will develop an algebraic strategy for finding the value of the stretch factor a for your project!

4-46 & 47 Jumping Jackrabbits

The diagram below shows a jackrabbit jumping over a three-foot-high fence. To clear the fence, the rabbit must start its jump at a point four feet from the fence.



Discussion points:

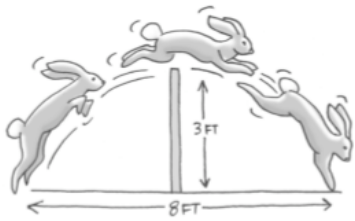
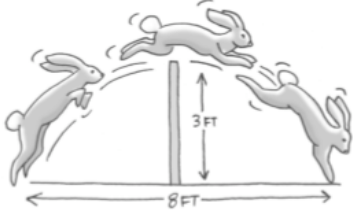
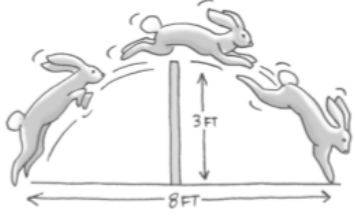
How can we make a graph fit this situation?
What information do we need in order to find an equation?
How can we be sure that our equation fits the situation?

Write an **equation** that models the path of the jackrabbit: $y = \underline{\hspace{1cm}} (x - \underline{\hspace{1cm}})^2 + \underline{\hspace{1cm}}$

- Choose where to place the x-axes and y-axes in the diagram above. Label as many points as you can on your sketch.
- What point on your graph can tell you about the values of h and k in the equation? Write the values for h and k into the general equation. Is your equation finished?
- With your team, find a **strategy** to find the exact value of a . Perhaps some of the points on your diagram will help?

- What are the domain and range for your model?

e. Did any team in your class get a different equation?

Other team's equation			
How they modeled the path of the jackrabbit:			
What did that team do differently?			

4-48 When Ms. Brown kicked a soccer ball, it traveled a horizontal distance of 150 feet and reached a height of 100 feet at its highest point. **Sketch** the path of the soccer ball and **find the equation** of the parabola that models it. Also include **domain and range of your model**.

Learning Log: Forms of a Quadratic Function

With your team, discuss all the different forms you know for the equation of a parabola. In the table below, write down each form, along with a brief explanation of how that form is useful.

Name of form			
Formula			
Brief explanation of how that form is useful.			